This is very manifeſt by the *ſealed Thermometers*, which I have, by ſeveral tryals, at laſt brought to a great certainty and tenderneſs: for I have made ſome with ſtems above four foot long, in which the expanding Liquor would ſo far vary, as to be very neer the very top in the heat of Summer, and prety neer the bottom at the coldeſt time of the Winter. The Stems I uſe for them are very thick, ſtraight, and even Pipes of Glaſs, with a very ſmall *perforation*, and both the head and body I have made on purpoſe at the Glaſs-houſe, of the ſame metal whereof the Pipes are drawn: theſe I can eaſily in the flame of a Lamp, urged with the blaſt of a pair of Bellows, ſeal and cloſe together, ſo as to remain very firm, cloſe and even; by this means I joyn on the body firſt, and then fill both it and a part of the ſtem, proportionate to the length of the ſtem and the warmth of the ſeaſon I fill it in, with the beſt rectified *Spirit of Wine* highly *ting'd* with the lovely colour of *Cocheneel*, which I deepen the more by pouring ſome drops of common *Spirit of Vrine*, which muſt not be too well rectified, becauſe it will be apt to make the Liquor to curdle and ſtick in the ſmall perforation of the ſtem. This Liquor I have upon tryal found the moſt tender of any ſpirituous Liquor, and thoſe are much more ſenſibly affected with the variations of heat and cold then other more flegmatick and ponderous Liquors, and as capable of receiving a deep tincture, and keeping it, as any Liquor whatſoever; and (which makes it yet more acceptable) is not ſubject to be frozen by any cold yet known. When I have thus filled it, I can very eaſily in the forementioned flame of a Lamp ſeal and joyn on the head of it.

Then, for graduating the ſtem, I fix that for the beginning of my diviſion where the ſurface of the liquor in the ſtem remains when the ball is placed in common diſtilled water, that is ſo cold that it juſt begins to freeze and ſhoot into flakes; and that mark I fix at a convenient place of the ſtem, to make it capable of exhibiting very many degrees of cold, below that which is requiſite to freeze water: the reſt of my diviſions, both above and below this (which I mark with a [o] or nought) I place according to the Degrees of *Expanſion*, or *Contraction* of the Liquor in proportion to the bulk it had when it indur'd the newly mention'd freezing cold. And this may be very eaſily and accurately enough done by this following way; Prepare a Cylindrical veſſel of very thin plate Braſs or Silver, A B C D of the figure Z; the Diameter A B of whoſe cavity let be about two inches, and the depth B C the ſame; let each end be cover'd with a flat and ſmooth plate of the ſame ſubſtance, cloſely ſoder'd on, and in the midſt of the upper cover make a pretty large hole E F, about the bigneſs of a fifth part of the Diameter of the other; into this faſten very well with cement a ſtraight and even Cylindrical pipe of Glaſs, E F G H, the Diameter of whoſe cavity let be exactly one tenth of the Diameter of the greater Cylinder. Let this pipe be mark'd at G H with a Diamant, ſo that G from E may be diſtant juſt two inches, or the ſame height with that of the cavity of the greater Cylinder, then divide the length E G exactly into 10 parts, ſo the capacity of the hollow of each of theſe diviſions will be $\frac{1}{1000}$ part of the capacity of the greater Cylinder.

der. This veſſel being thus prepared, the way of marking and graduating the *Thermometers* may be very eaſily thus performed:

Fill this Cylindrical veſſel with the ſame liquor wherewith the *Thermometers* are fill'd, then place both it and the *Thermometer* you are to *graduate*, in water that is ready to be frozen, and bring the ſurface of the liquor in the *Thermometer* to the firſt marke or [o]; then ſo proportion the liquor in the Cylindrical veſſel, that the ſurface of it may juſt be at the lower end of the ſmall glaſs-Cylinder; then very gently and gradually warm the water in which both the *Thermometer* and this Cylindrical veſſel ſtand, and as you perceive the ting'd liquor to riſe in both ſtems, with the point of a Diamond give ſeveral marks on the ſtem of the *Thermometer* at thoſe places, which by comparing the expanſion in both Stems, are found to correſpond to the diviſions of the cylindrical veſſel, and having by this means marked ſome few of theſe diviſions on the Stem, it will be very eaſie by theſe to mark all the reſt of the Stem, and accordingly to aſſign to every diviſion a proper character.

A *Thermometer*, thus marked and prepared, will be the fitteſt Inſtrument to make a Standard of heat and cold that can be imagined. For being ſealed up, it is not at all ſubject to variation or waſting, nor is it liable to be changed by the varying preſſure of the Air, which all other kind of *Thermometers* that are open to the Air are liable to. But to proceed.

This property of Expanſion with Heat, and Contraction with Cold, is not peculiar to Liquors only, but to all kind of ſolid Bodies alſo, eſpecially Metals, which will more manifeſtly appear by this Experiment.

Take the Barrel of a Stopcock of Braſs, and let the Key, which is well fitted to it, be riveted into it, ſo that it may ſlip, and be eaſily turned round, then heat this Cock in the fire, and you will find the Key ſo ſwollen, that you will not be able to turn it round in the Barrel; but if it be ſuffered to cool again, as ſoon as it is cold it will be as movable, and as eaſie to be turned as before.

This Quality is alſo very obſervable in *Lead*, *Tin*, *Silver*, *Antimony*, *Pitch*, *Roſin*, *Bees-wax*, *Butter*, and the like; all which, if after they be melted you ſuffer gently to cool, you ſhall find the parts of the upper Surface to ſubſide and fall inwards, loſing that plumpneſs and ſmoothneſs it had whilſt in fuſion. The like I have alſo obſerved in the cooling of *Glaſs of Antimony*, which does very neer approach the nature of Glaſs,

But becauſe theſe are all Examples taken from other materials then Glaſs, and argue only, that poſſibly there may be the like property alſo in Glaſs, not that really there is; we ſhall by three or four Experiments indeavour to manifeſt that alſo.

And the Firſt is an Obſervation that is very obvious even in theſe very drops, to wit, that they are all of them terminated with an unequal or irregular Surface, eſpecially about the ſmaller part of the drop, and the whole length of the ſtem; as about D, and from thence to A, the whole Surface, which would have been round if the drop had cool'd leiſurely, is, by being quenched haſtily, very irregularly flatted and pitted; which